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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/082,054	02/26/2002	Gou Endou	108066-00052	5416

7590 11/18/2003
ARENT FOX KINTNER PLOTKIN & KAHN, PLLC
Suite 600
1050 Connecticut Avenue, N.W.
Washington, DC 20036-5339

EXAMINER

SUMMONS, BARBARA

ART UNIT PAPER NUMBER

2817

DATE MAILED: 11/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)	
10/082,054	ENDOU ET AL.	
Examiner	Art Unit	
Barbara Summons	2817	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 August 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 2, 3, 7, 8 and 12-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 12 is/are allowed.
- 6) ☒ Claim(s) 2, 3, 7, 8, 13 and 14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 August 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The Proposed Drawing Corrections (i.e. Annotated Drawing Sheets) received 8/21/03 have been approved. The drawings are objected to as being marked-up copies and corrected replacement drawings must now be supplied as per the information below. Drawing corrections are no longer held in abeyance.

INFORMATION ON HOW TO EFFECT DRAWING CHANGES

Replacement Drawing Sheets

Drawing changes must be made by presenting replacement figures which incorporate the desired changes and which comply with 37 CFR 1.84. An explanation of the changes made must be presented either in the drawing amendments, or remarks, section of the amendment. Any replacement drawing sheet must be identified in the top margin as "Replacement Sheet" and include all of the figures appearing on the immediate prior version of the sheet, even though only one figure may be amended. The figure or figure number of the amended drawing(s) must not be labeled as "amended." If the changes to the drawing figure(s) are not accepted by the examiner, applicant will be notified of any required corrective action in the next Office action. No further drawing submission will be required, unless applicant is notified.

Identifying indicia, if provided, should include the title of the invention, inventor's name, and application number, or docket number (if any) if an application number has not been assigned to the application. If this information is provided, it must be placed on the front of each sheet and centered within the top margin.

Annotated Drawing Sheets

A marked-up copy of any amended drawing figure, including annotations indicating the changes made, may be submitted or required by the examiner. The annotated drawing sheets must be clearly labeled as "Annotated Marked-up Drawings" and accompany the replacement sheets.

Timing of Corrections

Applicant is required to submit acceptable corrected drawings within the time period set in the Office action. See 37 CFR 1.85(a). Failure to take corrective action within the set period will result in ABANDONMENT of the application.

If corrected drawings are required in a Notice of Allowability (PTOL-37), the new drawings **MUST** be filed within the **THREE MONTH** shortened statutory period set for reply in the "Notice of Allowability." Extensions of time may **NOT** be obtained under the provisions of 37 CFR 1.136 for filing the corrected drawings after the mailing of a Notice of Allowability.

Claim Objections

2. Claim 3 is objected to for the same reasons indicated in the prior Office action at paragraph 4. Applicants inadvertently failed to address this objection in the response received 8/21/03.

Maintained Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 2, 3, and 7 are rejected under 35 U.S.C. §§ 102(b) and 102(e) as being anticipated by Baier et al. WO 98/57429 and its equivalent U.S. 6,353,372, respectively, (both of record) for reasons of record repeated below as applying to the current claims.

The following discussion will reference the U.S. document.

Baier et al. discloses a SAW three IDT/double mode filter (Applicants' claim 7) device (see Fig. 7 and col. 1, Ins. 14-16) in which the input or output IDTs W20 and W21 are replaced by the structures shown in Figs. 1-6 so that the input impedance will be different from the output impedance (see col. 1, Ins. 61-66 and col. 2, Ins. 1-6). By replacing the input IDT W20 of Fig. 7 with the IDT structure of Fig. 3, Baier et al. discloses a SAW device with output IDTs 3 of a "first type" with an electrode finger overlap aperture length X , and an input IDT W20 of a "second type" split into two IDTs W1 and W2 (Fig. 3), wherein divided IDTs W1 and W2 are serial-connected (col. 3, Ins. 10-11) and inherently must have an aperture of $X/2$ because the impedance is increased by a factor of four (see col. 3, Ins. 13-14); and wherein the two divided IDTs W1 and W2 are arranged so that two input signals connected to a balanced input terminal pair (Inputs in Fig. 3) have a phase difference of 180 (i.e. by definition of "balanced" terminals). Baier et al. also discloses the connection part 1 (Fig. 3) of the divided IDTs be connected to ground (see col. 3, Ins. 15-16).

Also, regarding claim 2, although not particularly shown in the figures, the device is disclosed to have a balun function (see col. 1, Ins. 62-64), in which case the upper filter in Fig. 7 may be unbalanced providing an unbalanced input terminal pair to the lower filter which would have a split output IDT of Fig. 3 in place of output IDT W21. In other words, Baier et al.'s disclosure of the balun function provides the same structure as Applicants' Fig. 19.

Regarding claim 3, as can be seen in Fig. 3, the electrode fingers connected to the upper input terminal and extending downward in the figure, are slid a half wavelength relative to the electrode fingers connected to the lower input terminal and

extending upward in the figure (i.e. the width of fingers and spaces being a quarter wavelength).

Maintained Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 13 and 14 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Baier et al. WO 98/57429 and its equivalent U.S. 6,353,372 in view of Ueda et al. JP 9-167936 (cited by Applicants) or its U.S. equivalent U.S. 6,037,847 (all of record), for reasons of record repeated below.

Baier et al. discloses the invention as discussed above, except for disclosing the piezoelectric substrate to be the recited cuts of LiTaO₃ or LiNbO₃.

The discussion of Ueda et al. will reference the U.S. document. Ueda et al. discloses that piezoelectric substrates of 40 to 44 degree rotated Y-X LiTaO₃ and 66 to 74 degree rotated Y-X LiNbO₃ are advantageous over conventional cuts of LiTaO₃ and LiNbO₃ (see e.g. all of cols. 1 and 2) because they provide minimized SAW propagation loss and wide bandwidth filters (see e.g. col. 3, Ins. 53-62 and col. 4, Ins. 32-41).

Consequently, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the SAW device of Baier et al. (Fig. 7 with Fig. 3) by replacing the conventional cut piezoelectric substrate with either one of 40 to 44 degree rotated Y-X LiTaO₃ and 66 to 74 degree rotated Y-X LiNbO₃, because such an obvious modification would have been the mere substitution of art recognized alternate piezoelectric substrates, and because these specific cut angles of the substrates would have provided the advantageous benefits of minimized SAW propagation loss, a wide bandwidth, and good filter shape factor as suggested by Ueda et al. (*ibid.*).

7. Claims 2, 3, and 8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al. JP 2000-91883 (cited by Applicants) in view of Baier et al. WO 98/57429 or its U.S. equivalent U.S. 6,353,372 (U.S. '372)(all of record) for reasons of record pertaining to previously rejected claims 4-6.

Fig. 3 of Kondo et al. discloses a surface acoustic wave (SAW) device (i.e. filter 1b) comprising: an input interdigital transducer (IDT)[2b, 5b and 6b], and an output IDT [3b and 4b], wherein the input IDTs are those of the "first type", and the output IDTs are those of the "second type" as recited in claim 2; wherein the IDTs are disposed in a

SAW propagation path along arrow 1b on a piezoelectric substrate (not shown, see section [0016] of the attached machine translation); wherein an electrode finger overlap aperture length of the input/first type IDTs [2b, 5b and 6b] is X, and the output/second type IDTs [3b and 4b] are divided into two IDTs each having an aperture length of $X/2$ (see the sentence bridging pages 2 and 3 of the machine translation); and wherein the input/first type IDTs [2b, 5b and 6b] are connected to an unbalanced input terminal (i.e. coming from the output IDTs 2a, 5a and 6a of unbalanced filter 1a with unbalanced inputs 13a and 14a and outputs); wherein the output/second type two divided IDTs are serial-connected (ibid.); and wherein the electrodes led from the two divided IDTs are disposed so that two output signals [see output pads 9b-12b] connected to a balanced terminal pair [13b and 14b] have a phase difference of 180 degrees (i.e. by the definition of "balanced" terminals).

Regarding claim 3, in the two divided IDTs (e.g. 3b) a position of the finger connected to pad 11b and terminal 13b is a half wavelength closer to the IDTs 2b and 5b on both of its sides than the fingers connected to pad 9b and terminal 14b. Regarding claim 8, there are five IDTs.

However, Kondo et al. does not explicitly disclose that the common connection part of the two divided IDTs is connected to ground.

Baier et al. explicitly discloses that the common connection of the divided IDTs be "either grounded or floated, depending upon the requirement" (see U.S. '372 at col. 3, lns. 15-16 and Fig. 3).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the SAW device of Kondo et al. (Fig. 3), if

even necessary, such that the common connectors of the divided IDTs (3b and 4b) would have been grounded, because such an obvious modification would have been dependent upon specific design requirements as explicitly suggested by Baier et al. (see U.S. '372 at col. 3, lns. 15-16).

8. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. JP 2000-91883 (cited by Applicants) in view of Baier et al. WO 98/57429 or its equivalent U.S. '372 as applied to claim 2 above, and further in view of Ueda et al. JP 9-167936 (cited by Applicants) or its U.S. equivalent U.S. 6,037,847 (all of record).

The Kondo/Baier combination discloses the invention as discussed above, except for the piezoelectric substrate being the specifically recited cuts of lithium tantalate or lithium niobate.

Ueda et al. discloses these cuts for piezoelectric substrates as discussed in the paragraph 6 rejection above.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Kondo/Baier combination by substitution of the specific cuts of lithium tantalate or lithium niobate in place of the conventional cuts of the combination, for the same reasons given in the paragraph 6 rejection above.

Allowable Subject Matter

9. Claim 12 is allowable over the prior art of record.

Response to Arguments

10. Applicant's arguments filed 8/21/03 have been fully considered but they are not persuasive.

Applicants argue that Kondo does not disclose a first type of transducer with an aperture of X and a second type with two divided transducers each having an aperture length of $X/2$ (see pg. 9, second full para. of the amendment). This argument is not persuasive because Kondo clearly does disclose this feature as shown in the lower filter in Fig. 3, as explained clearly in the rejection, and as explicitly stated by Kondo at section [0017] and underlined by the Examiner in the machine translation provided.

Next Applicants argue that Kondo does not disclose the connection part of the divided transducers connected to ground. The Examiner agrees, but has made 103 rejections relying on Baier for this feature in both the prior Office action and this Office action.

The next few paragraphs of Applicants' remarks further discuss Kondo, but do not appear to put forth any further coherent arguments. Keep in mind, the Examiner uses only the second lower filter of Fig. 3 of Kondo to make the rejection such that the first type IDTs 2b, 5b and 6b of aperture X have an unbalanced input (i.e. coming from the unbalanced upper filter) and the second type IDTs 3b and 4b of aperture $X/2$ provide a balanced output at terminals 13b and 14b.

Next Applicants argue that Kondo does not show "reflecting electrodes disposed at both sides" of the transducers (see the last paragraph on page 10 of the amendment). Kondo clearly shows reflectors labeled 7b and 8b (see section [0016] of the translation provided).

Now, regarding Baier et al., Applicants argue that Baier does not show the first and second types of transducers "disposed alternatively" (see the last full paragraph on page 11 of the amendment). This is totally unpersuasive because Baier explicitly discloses that the split transducer structure (i.e. second type) of Fig. 3 take the place of the input or output IDTs in Fig. 7 (see col. 1, Ins. 14-16), such that the upper filter in Fig. 7 has an output transducer 3 of aperture X, and input transducer W20 with the aperture of X/2 as shown in Fig. 3 and another output transducer 3 disposed alternately. This was clearly explained by the Examiner in the rejection and is reiterated here.

Applicants further argue that Baier does not disclose the two divided transducers connected to ground. This is not the case. Baier clearly discloses connecting the center bar of the divided transducers to ground or to leave them floating as requirements dictate (see col. 3, Ins. 15-16).

Regarding Ueda, Applicants argue that Ueda fails to cure alleged deficiencies of Kondo and Baier. As indicated in the prior rejections and response to Applicants' arguments, it is the Examiner's position that there are no deficiencies in the 102 rejection using Baier and the combination of Kondo/Baier with Baier providing the ground connection of the divided transducers. Therefore, since Applicants did not argue any impropriety in the rejections utilizing Ueda, no further response by the Examiner is considered necessary at this time.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barbara Summons whose telephone number is (703) 308-4947. The examiner can normally be reached on M-Th, M-Fr.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bob Pascal can be reached on (703) 308-4909. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9318.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

bs
November 11, 2003


BARBARA SUMMONS
PRIMARY EXAMINER